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for

Platte and Arkansas Drainage Basins

By

Division of Irrigation, Soil Conservation Service United States Department of Agriculture Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.

CURRENT SERIAL RECORD

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As of

MAY 1, 1951



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SNOW SURVEY AND IRRIGATION

WATER SUPPLY FORECASTS

FOR

PLATTE-ARKANSAS RIVER BASINS

Report Propared

by

Homer J. Stockwell, Irrigation Engineer

and

Jack N. Washichek, Irrigation Engineer

Division of Irrigation Soil Conservation Service Colorado Experiment Station Fort Collins, Colorado



WATER SUPPLY OUTLOOK PLATTE-ARKANSAS DRAINAGE BASIN

May 1, 1951

Snow accumulation to April 1 was above normal on these watersheds except for the Southern tributaries of the Arkansas. During March the increase in snow water content was about average. On the South Platte and its tributaries, snow cover is well above normal for this date. On many courses the snow water content is a maximum of record since snow surveys were started in 1936. On the headwaters of the North Platte in Colorado and Wyoming snow cover is slightly above normal. Precipitation at valley elevations has been deficient for several months and soil moisture conditions are fair to poor in most districts. Except for the large reservoirs on the North Platte, the storage in most irrigation reservoirs is below last year and the past ten-year average

CHEYEDDE RIVER

The water supply outlook for the irrigated areas near the Black Hills in South Dakota is not favorable at the end of the season. Snow cover in mountain areas has been much below normal throughout the winter months. Snow in mountain areas has melted at this time and stream flow has been above average during the past 10 days. Runoff as the result of snow melt is practically complete for this season. Soil moisture conditions are reported as fair to good as of this time. Storage in Belle Fourche reservoir is now 103,000 acre-feet as compared to 141,000 acre-feet a year ago. In the Angostura reservoir there is now 34,000 acre-feet in storage.

NORTH PLATTE RIVER

On the Sweetwater River in western Wyoming the snow accumulation to date is about 110 percent of normal. Similar conditions also exist on the North Platte in Wyoming and around North Park in Colorado. On Snowy Range and Rabbit Ears Pass the snow cover is well above normal. Elsewhere on the Upper North Platte watershed the snow cover is normal or slightly above normal. In the valley areas of eastern Wyoming and western Nebraska soil moisture conditions are reported as fair. Valley precipitation has been deficient. Stream flow is reported as about normal. Irrigation water supplies are assured below the major reservoirs in Wyoming. Total storage in these four reservoirs is now 1,735,000 acre-feet as compared to 1,790,000 acre-feet a year ago. This is a noar record and is near three times the past ten year average. Storage in Kingsley and Sutherland reservoirs in Webraska now totals 1,800,000 acre-feet which is slightly less than a year ago.

On the Laramie River the snow cover is well above that on the Morth Platte because of heavy snow cover on the Snowy Range. Soil moisture conditions in the Laramie and Wheatland areas are reported as fair to good as a result of recent precipitation. Storage in Wheatland Reservoir is now 52,000 acre-feet as compared to 55,000 acre-feet a year ago.

SOUTH PLATTE RIVER

The irrigation water supply outlook for the South Platte and its tributaries is very favorable as of this date. Snow cover in mountain areas has been well above normal throughout the winter season. Cool temperature during April has retarded snow melt and stream flow is below normal. Except for the Cacha la Poudre record or near record snow water content was measured on nearly all of the snow courses on May 1, 1951. If the temperature remains cool and precipitation is normal for the first two weeks of May the peak flow of the South Platte tributaries will be relatively high. Total flow is expected to be much above last year and may: possibly exceed the flow during the snow melt senson in 1949. In respect to normal the snow cover on South Platte tributarios is as follows: Poudre 140 percent; Big Thompson 145 percent; Saint Vrain 165 percent; Boulder 175 porcent; Clear Creek 160 percent; and South Platte above Denver 140 percent. The snow cover at medium elevations is near twice normal. This should provide above normal runoff during May. Storage in irrigation reservoirs is still much less than last year and slightly less than the past ten-year average. Soil moisture conditions throughout the valley are reported as only fair.

Water tables in the South Platte are lower than at this time a year age in most places. The average lowering is between one and two feet but in a number of places it reached as much as 6 feet. The places registering the maximum lowering were those where pumping was greatest and where surface irrigation supplies were less than normal. Maximum declines took place along the South Platte near Henderson and Gilerest which are between Denver and Greeley. There were similar declines near Wollington in the Cache la Foudre drainage, south of Wiggins on the Bijou and lower Kiowa and on the Beaver near Gary, about twolve miles south of Brush.

ARKANSAS RIVER

Snow cover on the Arkansas watershed is well above normal from Monarch Pass to Fremont Pass as of May 1. The extreme deficiency in snow cover still remains on the headwaters of the southern tributaries, the Huerfano, Cucharas and Purgatoire Rivers. The summer flow of these streams will probably be less than last year and near a minimum of record. The summer flow of the Arkansas at Salida and Pueblo should be well above last year and the past ten year average. Stream flow is reported as below average. Soil moisture conditions are described as poor throughout the valley. Precipitation has been deficient for several months. Except for the Twin Buttes Reservoir in southeastern Colorado carryover storage of irrigation water is very low.

Water tables along the Arkansas River between Fowler and Rocky Ford are 1 to 2 feet lower than a year ago. Little change occurred between Pueblo and Fowler. A lowering of from 1 to 2 feet occurred on the Fountain near Fountain.

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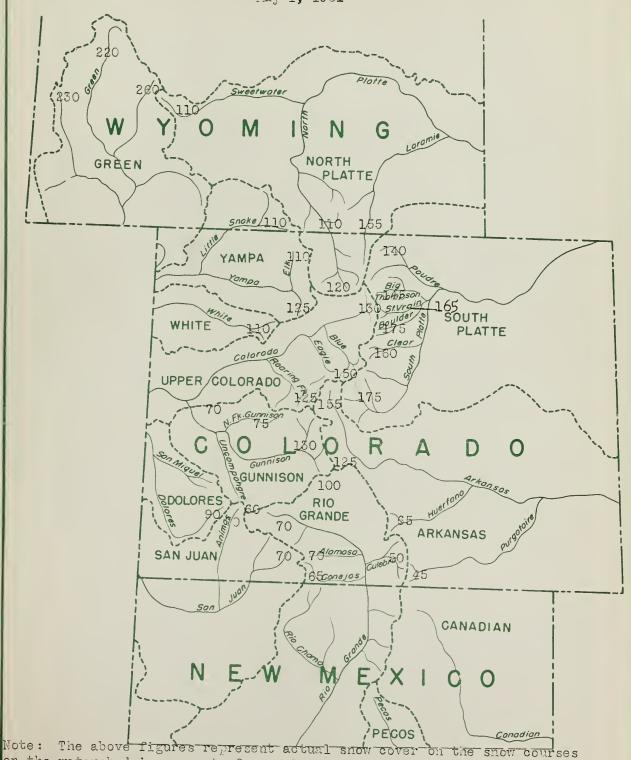
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WATER CONTENT OF SNOW ON THE WATERSHEDS OF PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal May 1, 1951



Note: The above figures represent actual snow cover on the snow courses on the watershed in percent of normal May 1, 1951. These do not necessarily coincide with expected summer runoff in percent of normal.



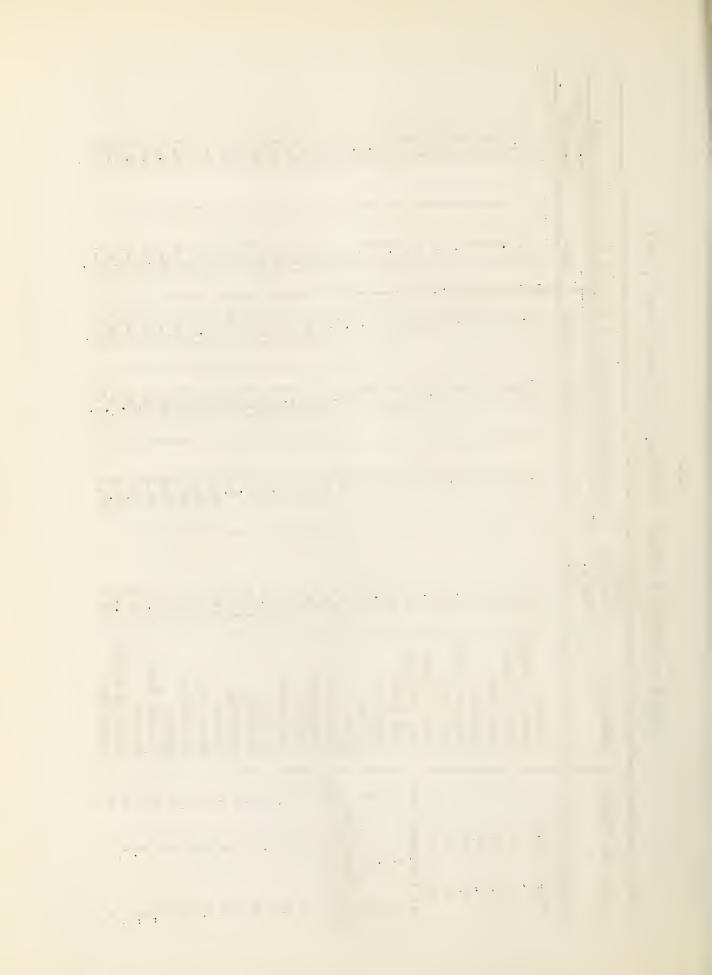
PLATTE ARKANSAS DRAINAGE BASINS STREAM ELCW FORECASTS, May 1, 1951

		C			
		April-Sept.,		Incl., otreamilow, Acre Feet	
Basın and Stream	Forecast 1951	1950	Measure 1949	Measured Funoff 1948	10-year Avg. 1940-1949
NORTH PLATTE					
Sweetwater at Alcova	000,09	162,000	87,000	700001	000,99
North Platte at Saratoga	750,000	678,000	000,066	421,000	000,109
Medicine Bow near Hanna	135,000	000.416	161,000	91,000	111,000
Laramie at Jelm	120,000	000,92	113,000	83,000	93,000
Laramie at Lookout	135,000	67,000	124,000	61,000	80,000
SOUTH PLATTE					
Poudre at Canon	300,000	186,000	323,000	201,000	21,5,000
Big Thompson at Drake	145,000%	104,000	172,000	95,000	113,000
Saint Vrein at Lyons	130,000	26,000	000,611	900,419	87,000
Boulder at Orodell	85,000	39,000	000,19	45,000	54,000
Clear Creek at Golden	200,000		185,000	136,000	145,000
ARKANSAS					
Arkansas at Salida	450,000	305,000	7,60,000	422,000	359,000
Arkansas at Pueblo	425,000	249,000	512,000	493,000	131,000
Cucharas at La Veta	10,000		16,000	17,000	19,000
Purgatoire at Trinidad	20,000		63,000	68,000	70,000
*Excluding Diversions	P			-	

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STATUS OF RESERVOIR STORAGE, PLATTE-ARKANSAS BASIN, May 1, 1951

BASIN AND STREAM	RESERVOIR	USABLE	THOUSANDS	ACRE FEET	T IN STORAGE	About	May 1, 1951
		(Thous.	1951	1950	1949	1948	10-year Avg. 1940-1949
MISSOURI RIVER	Windsor	18.6	77.1	11.8	77-11	2-1/1	12.7
10 11 11	Cache la Poudre	9.5	6.2	٦ ا 8	7,6	5.0	7.9
11 11	Fossil Creek	11.6	7.1	9.6	6.2	10.8	8.4
=	Terry Lake	8,2	4.2	4.5	4.6	6,1	5.2
=	Halligan	6.4	0°0	0.0	0.0	2.5	2.1
=	Chamber's Lake	8.8	1.9	2.8	2.3	2.7	2.8
=	Cobb Lake	34.3	4.9	11.3	3.8	2,0	4.5
=	Black Hollow	8.0	0.7	7.8	2.3	4.2	3.4
Big Thompson River	Lake Loveland	14.3	2.7	بر	2.4	10.3	بر 8
= =	Boyd Lake	770	7.9	26.1	21.9	30.1	17.4
=======================================	Lone Tree	9.2	8.7	8,2	8.0	9.3	8,0
= =	Mariano	5.4	0.4	1.7	0.7	4.6	3.3
St. Vrain River	Union	12.7	3.4	9.1	6.1	12.7	7.1
South Platte River	Eleven Mile	81.9	71.9	81.9	81.9	81.9	80.8
=======================================	Cheeseman	79.0	26.1	56.4	56.8	79.0	8,99
=======================================	Marston	18.9	17.1	15.4	14.4	15.5	15.7
=======================================	Barr Lake	32.2	25.0	25.3	56.9	28.5	24.1
=======================================	Milton	24.4	10.2	17.6	15.0	20.8	14.9
= =	Standley	18.5	9.6	11.0	12.5	17.8	14.2
= =	Marshall	10.3	3.7	2.1	2.0	5.4	7.6
=======================================	Antero	33.0	20.3	21.0	20.3	21.0	16.7
= =	Horse Creek	20.6	10.9	15.2	12.2	12.5	6.6
=======================================	Riverside	57.5	46.7	56.8	55.4	59.4	50.3
=======================================	Empire	37.7	25.4	33.3	33.3	34.5	31.7
= =	Jackson Lake	35.4	34.7	34.4	33.4	35.4	34.5
=======================================	Prewitt	32.8	21.2	28.4	27.4	31.2	24.3
	Point of Rocks	70.0	6.09	68.9	51.6	67.3	61.4
1	Julesburg	28.2	22.2	21.7	22.7	21.7	22.5
					**		



BASIN AND STREAM	RESERVOIR	USABIE	THOUSA	THOUSANDS ACRE FEET		IN STORAGE ABOUT MAY	OUT MAY 1
		(THOUS. A.F.)	1951	1950	1949	1948	10-year Avg.* 1940-1949
Month Drotte Bine	G. +15 cm 1	00,	ć	-			` ` ` '
North Flatte Miver	Sutherland	185.00	71.8	10.4	47.8	39.9	9*91
	Kingsley	1996.0	1729.5	1838,5	1732.0	1711.0	1103.4
1,	Minatare	60° 8	17.6	53.0	36.6	148.0	39.9
11 11	Alcova	190.0	163.0	179.2	130.2	166.5	124.1
= =	Seminoe	1025.0	546.9	601.8	5,645	646.5	319.6
# #	Guernsey	19.5	7.6	18.9	34.1	22.5	37.0
T T	Pathfinder	1045.5	1017.2	988.	636.6	700.6	360.9
Laramie River	Wheatland	70.4	52.0	54.9	51.0	90.7	90°1
ARKANSAS RIVER							
Arkansas River	Twin Lakes	57.9	11.3	23.7	15.4	38.8	23.4
=	Sugar Loaf	17.4	<u>بر</u> ن.	6.53	7.1	11.1	0 0
=======================================	Clear Creek	11.4	0,57	7,8	5.2	8.0	5,3
36	Meredith	11.9	0.0	0.0	19.5	31.6	23.3
#	Horse Creek	26.9	000	5.2	11.8	17.2	11.7
14	Adobe Creek	9°19	0.0	22.0	22.5	56.8	34.5
#	Cucharas	0.01	0.7	2.2	8.0	20.0	7.9
11	Two Buttes	10.9	28.8	14.0	9.5	7.0	7.9
2	John Martin	655.0	57.8	100.9	124.2	95.8	**************************************
11	Great Plains	150.0	25.5	63.6	84.1	132.1	71.1
Purgatoire River	Model	15.0	0°0	0.2	1.2	14.3	5.2
CHEVENINE RIVER							
Cheyenne River	Belle Fourche	198.1	103.9	141.2	145.5	162,6	133,3
	Angosture	160.0	34.0	17.0			

*Some for shorter periods

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SUMMARY OF MAY 1 SNOW SURVEYS AND COMPARISON OF DATA TITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS Snow Dept Fourteen 19 year Avg.* In PLATTE RIVER Sweetwater North Platte River South Platte River* South Platte River* 13.7 17 Crow Creek Poudre River Big Thompson River* 53.8 55	Snow Depth Fourteen 195 year Avg.* In. 17.9 53.0 17.9 53.0 31.7 38.0 7.9 53.0 35.1 37.0 35.1 37.0	epth 1950 In. 57.0 53.4 17.2 17.2 37.0 37.0	epth 1950 1951 In. In. 57.0 42.8 53.4 55.2 17.2 30.5 5.0 7.5 37.0 49.2 55.6 70.0	Mater year Avg.* In. 11.1 5.4 12.6 18.2	Conte 1950 12.8 5.5 12.8 12.4 16.8	In 1951 13.7 20.9 17.6 1.1 17.8 256.4	Number Courses in Average 3 3 1 6 6	Content Courses Snow Densi n 1950 1951 in Fourteen 1950 1951 in Fourteen 1950 1950 1951 in Percent Percent 13.7 2 37 41 20.8 20.9 10 39 39 12.8 17.4 8 35 34 35 15.4 17.8 6 36 34 16.8 26.4 2 34 37 11.5 11.5 11.5 11.5 11.5 11.5 11.5 11.	Snow Density rteen 1950 r r t li li 32 22 34 36 31 30 37	1951 1951 32 38 35 36 38 38	1951 Water Content in percent of Fourteen 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 1950	r Content ent of 1950 58 101 136 173 100 143 157
Boulder Greek Clear Greek	31.0	で で で で で で で で で で で で で で	70.27	1 — —	10.9	20.2	100	32.22	38	35%	174 158	185
ARKANSAS RIVER 25.0 *Some for shorter periods.	25.0 15.3 32.3 riods. **Above	15.3	32.3 Above	**Above Denver.	5.4	10.9	10	33	35	34	131	202

D A T A* PRECIPITATION

		May 1, 19	51		
		Precipitation	Departure	Precipitation	Departure
WATERSHED	STATE	October 1 to	from		from
		April 30 N	Normal	April	Normal
		Tuches	Inches	Inches	Inches
Month Dlatte	Warnaning	<u> </u>	20.0-	1.67	£0.03
So our France	Surring W	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		- (77 0
South Platte	Colorado	5.75	-1°34	1,43	00.01
Arkansas	Colorado	7.09	-1,82	2.32	+0.21

*Average selected high elevation stations

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PLATTE-ARKANSAS RIVERS SNOW SURVEYS

Yrs. of Av. "ater Content (Inches) Past Record 23.7 7.0 19.3 12.8 33.2 32.8 21.8 7.1 13.4 2.4 18.7 Snow Cover Measurements Rec. 717 Water Content (Inches) 1949 0000 24.5 7.0 21.4 2.9 16.0 33.2 23.6 8.2 13.5 6.8 0.0 1950 22.83.3 12.5 (Inches) 1951 13.7 Depth 68,868,17,668,88 64,67,67,67,68,68,68 Snow 10.5 15.0 0.0 7.5 12.8 55.2 PLATTE RIVER Survey 10300 14/30 9200 5/1 9300 14/26 9300 14/26 9300 14/26 9300 14/26 9300 14/26 9400 14/28 9400 14/28 9400 14/28 9400 14/28 9000 4/26 9000 4/26 Date May 1, 1951 8700 5/1 Range Elev. of drainage werage for Drainage 9000 Average for 727 101W 1031 10001 83年 78w 85w 85w 86w 80w 81w 85w 78w 2228 Twp. 30N 30N 30N Lew Lew 30N 12N 15N Location Sec. 87726 566 35 1 Colo.
7 "
8 "
62 " 29 Wyo. 47 " 57 " 7 Wyo. 34 Wyo. State 39 = = and 22 % 27 0 Grannier Meadows NO. PLATTE RIVER SWEETWATER RIVER Columbine Lodge Willow Cr. Pass* N. Barrett Creek Drainage Basin N. French Creek Webber Spring Pole Mtn, #2% Cameron Pass Larsen Creek Spring Creek Bottle Creek Snow Course South Pass* Old Battle Northgate CROW CREEK Park View Ryan Park La Bonte Boxelder Albany Pearl

*On adjacent drainage

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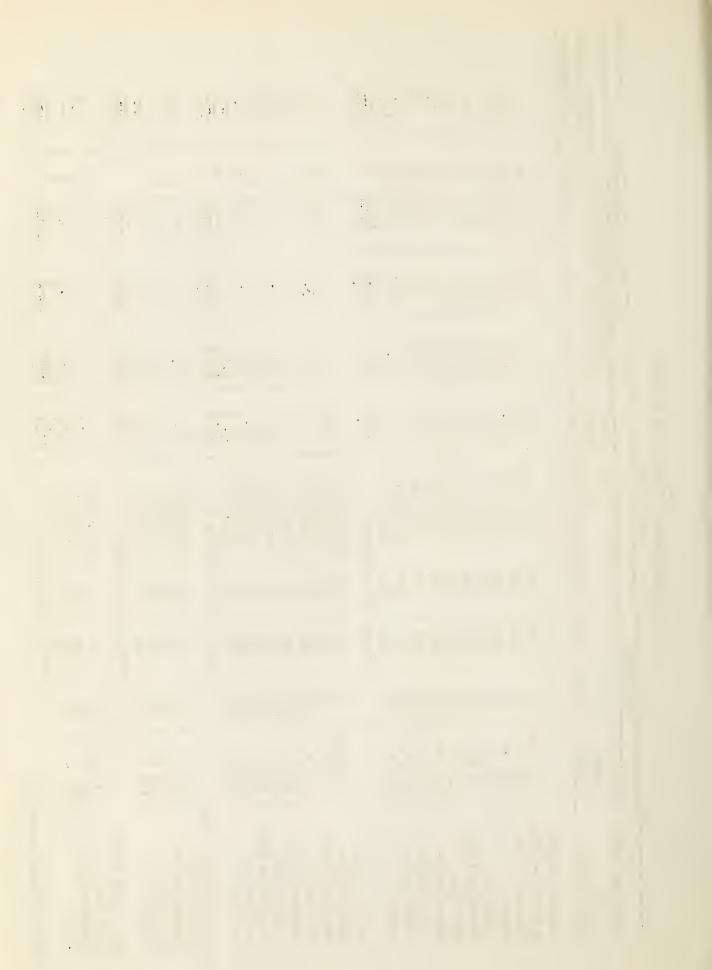
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-8... PLATTE-ARKANSAS RIVERS SNOW SURVEYS May 1, 1951

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		T08207	OII						2000	- 1	cilieito	
Drainage Basin	No.					Date	Snow	Water C	Content (Inches)		- 1
and	and					of	Depth			-	Yrs.of	
Snow Course	State	Sec.	Twp	Range	Elev.	Survey	(Inches)	1951	1950	1949	Rec.	tent(Inches)
						RIVER						
LARAMIE RIVER						•	•	-				
W. Port. G-P. Tun.	14 Colo.	٬ س	 88	751	9600	4/26	29.5	9.4	9.	0,0	14	0 • 1
Deadman Hill*	20	56	TON	751	10200	4/29	68.5	22.7	17.4	18.9	12	16.8
Roach	88 =	᠕	NOT	77W	9800	4/28	68.1	24.6	23.2	22.0	20	20.2
McIntyre	" נננ	35	TON	76W	9100	4/30	43.1	12.8	11.4	10.5	2	1
Brooklyn Lake	3 Wyo.	1	16N .	79W	10200	4/29	96.3	36.9	27.8	27.4	15	24.5
Fox Park		77	13N	78W	9300	4/29	29.4	10.0	14.7	5.1	15	5.4
Pole Mtn.#2*	34 "	35	15N	72W	8700	5/1	7.0	1.1	1,1	2.9	17	2.4
Libby Lodge	35 =	56	16N	78W	8700	1/30	145.7	15.8	9.2	6.9	15	2.0
Hairbin Turn	36 "	24	16N	79W	9500	4/29	56.6	19.0	15.5	12.8	15	10.8
Albany	= 89	18	14M	781	0076	4/29	44.1	17.0	12.4	10.4	~	1
۵	-		Average	for dra	drainage		50.2	17.4	12.8	12.4		11.11
POUDRE RIVER))							
Cameron Pass	1 0010.	2	N9	76W	10300	14/30	68.8	23.5	24.2	24.5	15	23.7
Chambers Lake	2	9	NZ.	75W	9000	1,729	27.6	10.0	3,9	2.5	15	3.8
Big South	=	33	8N	75W	8600	4/29	5,1	۲.	1,1	0.1	15	9.0
Deadman Hill	50 =	56	TON	75,	10200	1/29	68.5	22.7	17.4	18.9	12	16.8
Lake Irene*	59	ω	Ŋ	75.	10600	1,/28	84.4	34.5	27.0	26.1	13	23.4
Hour Glass Lake	1 89	18	K.	73.1	9500	4/28	6.04	14.6	7.0	11.5	Ħ	7.3
Red Feather	= 128 = 1	56	Non		0006	4/28	27.9	_†°	3.5	0.0	~	1
Lost Lake	150 "		ATO TOTAL	for draftnage	0056	4/2/	1001	0 × CT L	1 61	1 2	!	7 61
BIG THO: PSON RIVER		4	בייי טני טני די טייי	707	- 19gg		1) •	† • •	-		1
Lake Irene*	55 =	ω	SN.	75.1	10600	É	84.4	34.5	21.0	26.1	13	23.4
Hidden Valley	95 =	23	Z.	75.	9550	N	55.5	18,3	12.5	15.6	10	12.9
Deer Ridge	115 "	19	<u>K</u>	73.1	9050	5/1	23.2	7.4	1.5	2.3		1
Longs Peak	178 "				10500	2	53.3	19.0	1			1
		4	Average	for dra	drainage		70.0	26.4	16. K	20.9		T8.2
ST. VRAIN RIVER			a.				•			,	1	,
	O	24	3N	743	10000	5/1	59.3	22.4	14.5	16.2	15	13.5
land Lake	,, 911	77	3N	734	8600	5/1	13.6	4.9	0.7	0.0	2	1
Ward	134 "		A	2	0056	5/1	33.7	10,5	2.0	0	Н	
- S	(. 4	Average	ior ara	drainage		5%.3	h•22	14.5	7.0T		13.5

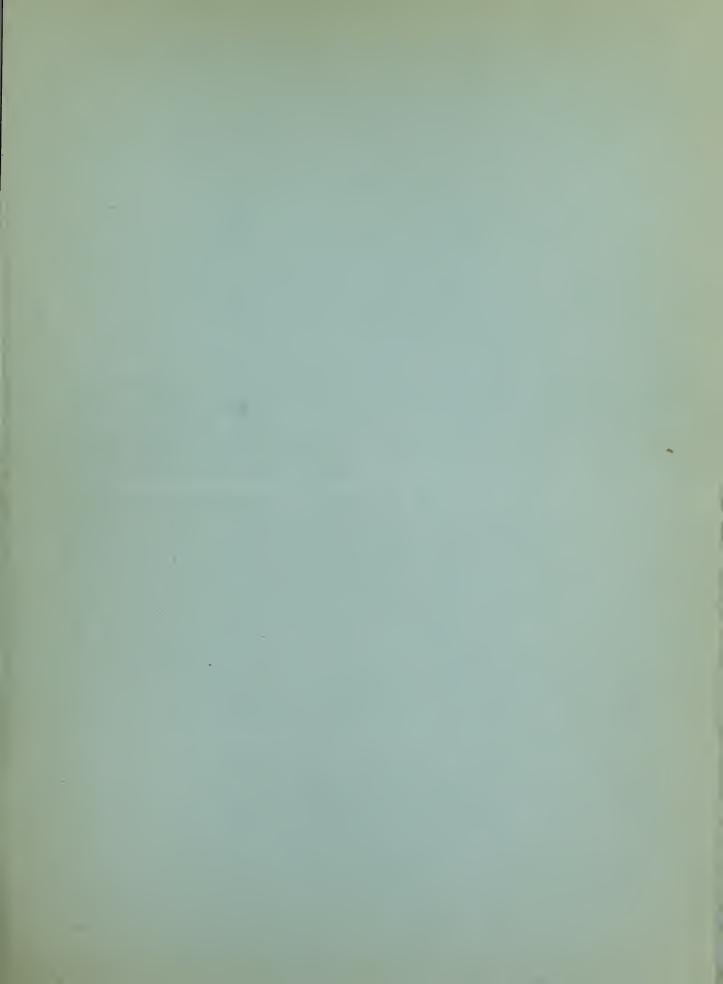
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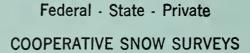


-9-PLATTE-ARKINSAS RIVERS SNO. SURVEYS Way 1, 1951

		Past Record	Av. dater Content (Inches)		1.7	11.6	0 0 0	18.7	1 1	į	1	15.9	10.9	ط « ن	٠,٠			7.5	† ·	₩.	٦٠٠٥	70.2 8 3	^	t oc	· · ·	17.1	6.9	18.1		8.3
	lents	a	Yrs.of Record		12	-1	7	30	2 !	1	!		17,	7,	† '	~ (Ν (N		77.	→ 1.	<u> </u>	J 5) 뉴	3 8	7	in Ti	10	00	1
	Measurements	Inches /	1949		1.0	1 1	7	15.8	3.6	!	1 0	12•7	9.1	0 1	7.0	000)) (0 0	Ì	3.4	7-	T.5.44	7 0	, , ,	0.0	14.9	7.2	17.5	21.3	7.6
	٠.١	~	1950		3.1	10.9	r Ju	3.0.	0.9	;	1 0	19.3	10.4	0.0	0.0	0 0	0.0	0,0	`	οι ∞ \	°.	7 t	- c	0, 0		19.2	1.0	11,3	16.5	2.4
S S	onc	Mater Content	1951		36.6	20.2		27.7	10°5	19.7	25.6	25.I	16.7	0,0	7 11	~ ~ ~	0.0	000	<u>`</u>	11.8	11.	ر د ا ـ	††•††) , , ,		27.7	6.1	21.7	13.2	10.9
7		Snow	Depth (Inches)	IVER	11.6	50.2	0 17	81.1	34.3 51.6	9.89	75.2	(T•5)	53.2	000	38.2	13.1	0.0	30.5	```	32.6	. of .	4.5.5	742.0	o a	, w	76.3	17.6	60.3	L1.7	32.3
May 1, 195			Elev. of Survey	PLATTE R	9400 5/1 10300 4/30	9400 5/1 drainage	70/1/00/01	11250 4/27	9650 4/29 10500 4/29		11200 4/27	drainage ,	11400 4/30	10000 4/30											9700 4/7				10600 4/27	
T 000 ++000	ation		Range		747	for		769	25E	7511	764	for	784		NO)	子 ()		for	1	8077	85%	공 [בן) בוני	100. CT	5 E	707	1.69	王9	80 E	4-4
I	TOOT		Twp.		818	Average	0.	3 KZ	85 85 85	3N	SH	Average	88	86	S. (S 5	3	Average	} }	88	113		NOT C	280	207	8	315	N67	158	Average
	1		Sec.		282	N	27	- 2	727	10	27		13		† † † † † † † † † † † † † † † † † † †	β, '	⊣ 0	28		7	25	24	- T	00	23	ر (ا ا	16	K K)
		No.	and State		5 Colo.	1551	: 5		117 "	138 "	1091	爲	14 C	15	: : : : : : : : : : : : : : : : : : :	118	T20	130 "		19 Colo.	- 57 - 7	75	47 27 27 27 27		78 #	79 #	= 15	95 "	" [21] " [21]	drainage
And the second s		Drainage Basin	and Snow Course	BOTTLINER CREEK		MOIIat	CLEAR CREEK	Grizzly Peak*	Empire Berthoud Falls		Cle ar Creek	SOUTH PLATE RIVER	Hoosier Pass	Fairplay	Jefferson Cr.	Geneva Park	Antero	Deer Creek	ARKANSAS RIVER	Tennessee Pass		Marshall Creek*	Toncha oreek	To Veta Pass	Jan Coa Iassa Jani Te Park	Fremont Pass	Blue Lakes	Monarch Pass	St. Elmo	nt

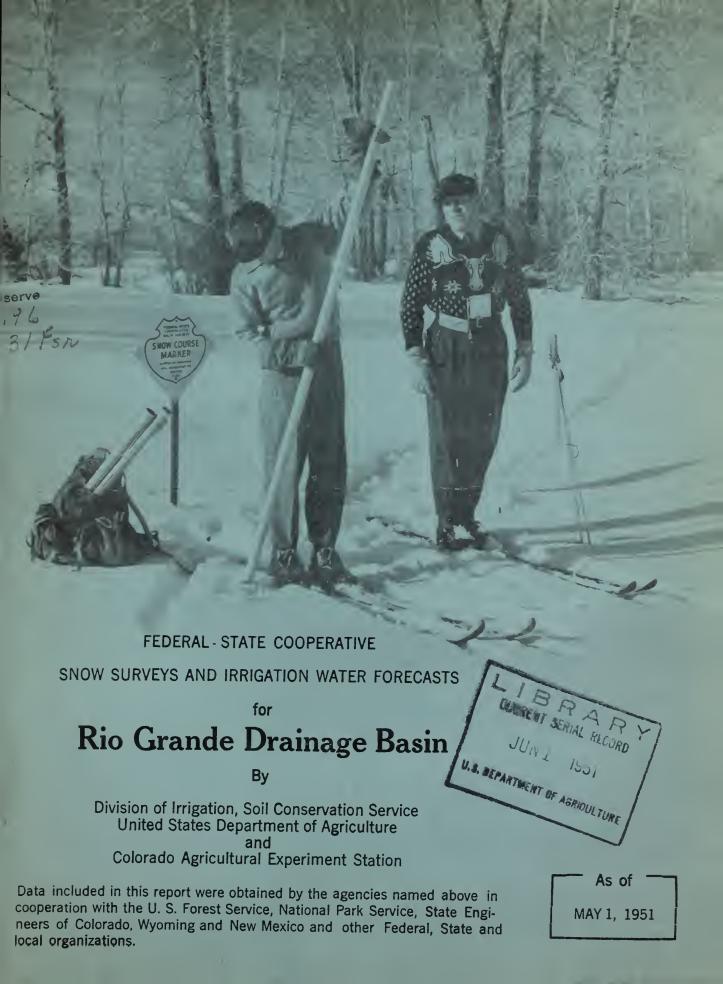






Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"





FEDERAL-STATE COOFERATIVE

SNOW SURVEY AND IRRIGATION

WATER SUPPLY FORECASTS

FOR

RIO GRANDE BASIN

Report Prepared

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Homer J. Stockwell, Irrigation Engineer

and

Jack N. Washichek, Irrigation Engineer

Division of Irrigation Soil Conservation Service Colorado Experiment Station Fort Collins, Colorado

Miscellaneous Series Paper No. 491 Colorado Agricultural Experiment Station



WATER SUPPLY OUTLOOK RIO GRANDE AND CANADIAN DRAINAGE BASINS May 1, 1951

The water supply outlook for the Rio Grande in San Luis Valley is not favorable at this time and is critically unfavorable in New Mexico. Snow cover along the Continental Divide is about 70 percent of normal. On the Sangre de Cristo range to the east of San Luis Valley the current snow cover is 50 percent of average. In northern New Mexico the snow fall has been extremely deficient with near minimum snow measurements on most courses during the winter months. Precipitation has been deficient and soil moisture conditions are poor throughout the valley.

RIO GRANDE

Seasonal snow accumulation to May I along the Continental Divide to the Mest of San Luis Valley is about 70 percent of normal. To the east of the valley along the Sangre de Cristo and Culebra ranges snow cover is about 50 percent of normal. There is no snow on the valley floor or in the foothills. The summer flow of the Rio Grande, Alamosa and Conejos Rivers will be about 50 percent of normal. The soil moisture conditions in irrigated areas are only fair due to deficient precipitation during the past several months. Storage in irrigation reservoirs is about 15 percent of May 1, 1950 and much below the past average.

On the Rio Chama the summer flow will be about 50 percent of normal and similar to a year ago. Elsewhere in northern New Mexico the snowfall has been very deficient. Precipitation in northern New Mexico has been above normal at higher elevations during April. On the Rio Grande-Canadian Divide the snowfall has been slightly more than last year but much below the past average. Soil moisture conditions are described as poor in the middle Rio Grande area. Storage in El Vado reservoir is now 30,000 acre-feet as compared to 66,000 acre-feet a year ago.

The combined storage in Elephant Butte and Caballo reservoirs is now 340,000 acre-feet, less than one-half of that stored on May 1, 1950. Soil moisture in the lower Rio Grande valley is reported as fair. Streamflow is well below normal.

There has been practically no snow on the headwaters of the Pecos near Santa Fe. Storage in the Carlsbad project reservoirs is over 100,000 acre-feet, slightly less than last year but well above the past ten year average.

The general water supply outlook for the Rio Grande drainage is critically unfavorable. A series of dry years has depleted reservoir storage and very little summer runoff may be expected from the past season snow accumulation.

An extreme curtailment of water use, especially in New Mexico, will be necessary.

CANADIAN DRAINAGE

There has been very little snow on Canadian River tributaries. April precipitation has been below normal. Soil moisture conditions are reported as fair in the Tucumcari project. Storage in Conchas reservoir is now 268,000 acrefect as compared to 289,000 acrefect a year ago.

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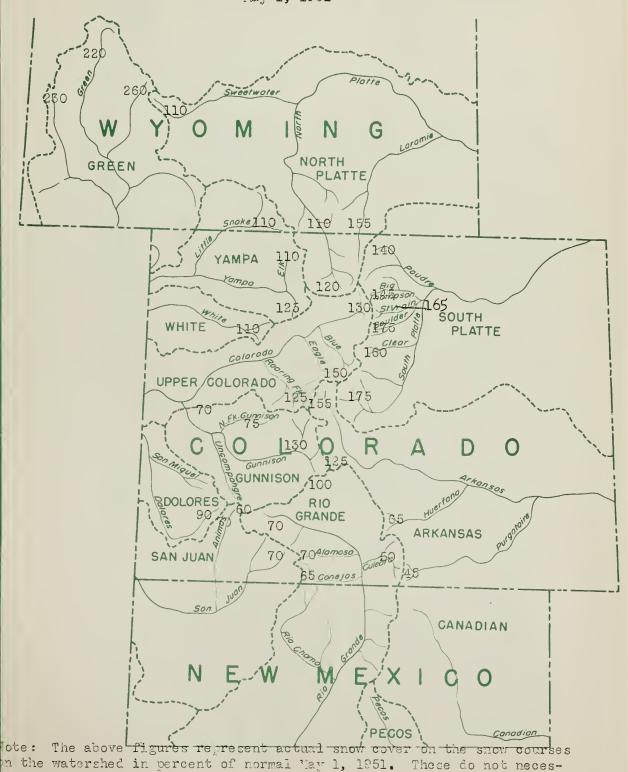
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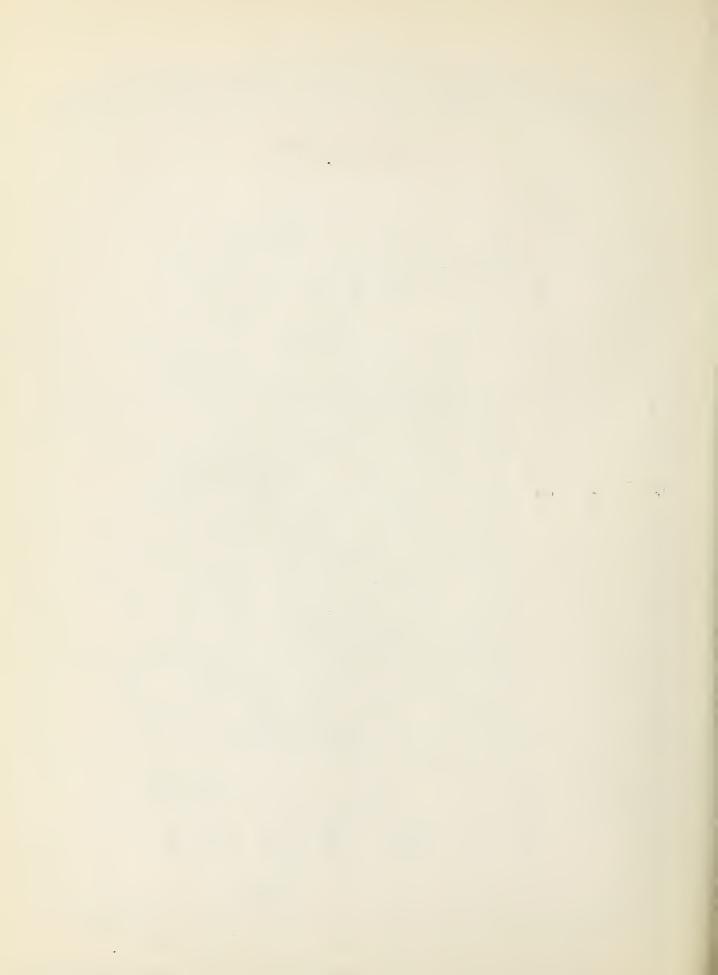
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WATER CONTENT OF SNOW ON THE WATERSHEDS OF
PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS
BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal May 1, 1951



arily coincide with expected summer runoff in percent of normal.



RIO GRANDE DRAINAGE BASINS

STREAM FLOW FORECASTS, May 1, 1951

		Anril Sent	The Stream	Annil Sent Incl Streamflow Acre Feet	
BASIN AND STREAM	Forecast 1951	1950	Measured Runoff 1949	1948	19-YEAR Avg., 1940-1949
Sou RIO GRANDE					
South Fork at South Fork	000,006		197,000	192,000	142,000
Rio Grande at Del Norte	325,000	397,000	832,000	823,000	900,000
Alamosa above Terrace Res.	115,000		105,000	100,000	81,000
Conejos at Mogote	150,600	148,000	268,000	262,000	224,000
Culebra at San Luis	15,000		35,000	36,000	37,000
Rio Chama at Park View	120,000		320,000	222,000	232,000
Costilla at Costilla	15,000	15,000	33,000	35,000	39,000
Toas at Los Cordovas	15,000		28,000	29,000	45,000
Embudo Greek at Dixon	25,000		53,000	000,59	900,59
Rio Grande at Otowi Bridge	225,000%	267,000	962,000	987,000	915,000
Rio Grande at San Marcial	75,000		852,000	727,000	717,000
Pecos at Pecos	20,000	13,000	79,000	000,07	73,000

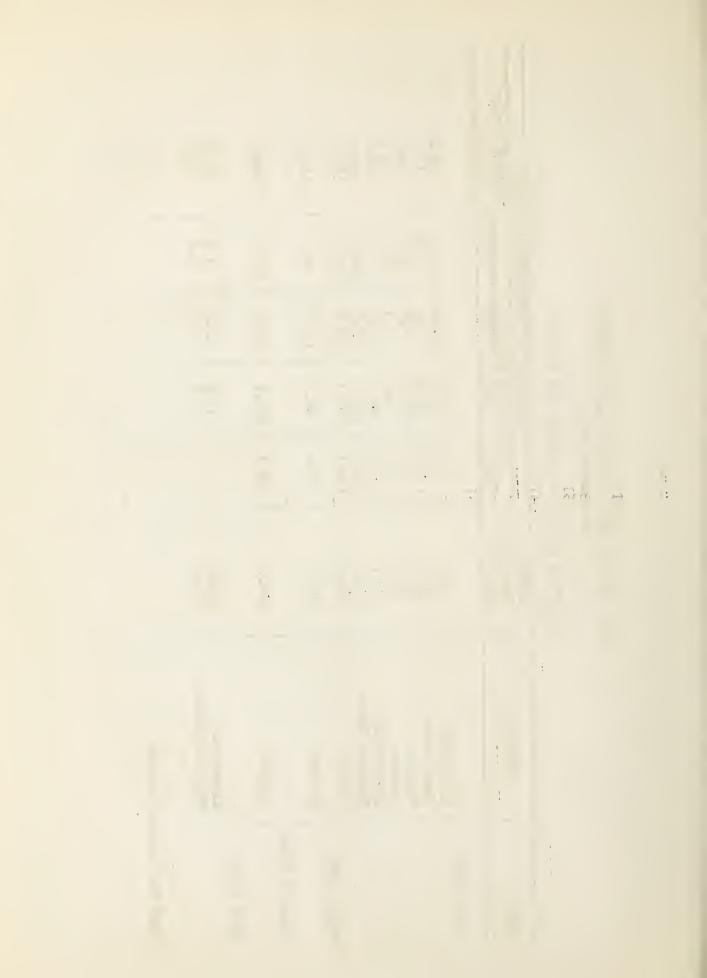
*Including change in syorage in El Vado Res.

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SNOW SURVEYS AND IRRIGATION WATER FORECASTS RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, MAY 1, 1951

		USABLE		THOUSANDS	OF ACRE F	THOUSANDS OF ACRE FEET IN STORAGE	ORAGE
STREAM	RESFRVOIR	CAPACITY		About May 1	ty 1		leryear ave.*
7		1000 A.F.	1951	1950	1949	1948	1941-50
RIO GRANDE							
	Rio Grande	45.8	5.1	19.7	21.2	30,5	18,1
	Santa Maria	5.0	2.9	22.5	17.3	7,5	13.0
	Sanchez	103.0	7.7	13.0	8.9	12.0	16.1
	Terrace	17.7	1.8	7, 7	2,7	10,7	7.6
	Continental	26.7	л. 0	19.0	12.6	8.9	10.9
	Elephant Butte	2273.7	196.8	615.2	508.3	408.6	6.096
	Caballo	365.0	144.1	193.7	149.4	151.9	185.6
CHAMA RIVER							
	El Vado	226.0	30.0	0.99	115.0	98.0	113.9
CANADI IN RIVER							
	Conchas	0.009	268.3	288.8	300.6	371.0	324.5
PECOS RIVER	() () () () () () () () () ()	0.7		7.		l.	7 51
	Alamogorao McWillan-Avalon	140.0		5 w v rv	3.0	i rv v rv	13.3
					_		
*Some for shorter periods	er periods		•				



SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
May 1, 1951

SUMMARY OF MAY 1 SNOW SURVEYS AND CO PARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

	Sn	Snow Depth	th	Water Content	Conte	nt	Number	Snow	Snow Density		1951 Water Content	ontent
WATERSHEDS	Fifteen			Fifteen			Courses	Fifteen			in percent of	of
	year	1950	1950 1951	year	1950	1951	ri.	year	1950	1951	Fifteen Yr.	
	Avg.*			Avg.*			Average	Avg. *			Avg.*	1950
		In.	In.	In.	In.	In.		Percent	Percent	Percent		
Rio Grande (Colo.)		10.0		8.7	1.5	ر ک س	10	9	元	30	61	118
Upper Rio Grande	23.1	11.5		10.2	5.6	7.0	m	-	6	2	69	125
Alamosa River	34.0	27.5		12.0	10.9	8.1	0	35	크	82	67	75
Conejos River	18.3	2,2	17.7	9.9	2.8	5,3	W	36	겂	2	8	190
Culebra River	25.6	0.0		9.1	0.0	7.5	H	36	1	%	8	1
*Some for shorter periods	periods											

PRECIPITATION DATA*

		Precipitation	Departure	Precipitation	Departure
WATERSHED	STATE	October 1 to	from		from
		April 30	Normal	April	Normal
		Inches	Inches	Inches	Inches
Canadian	New Mexico	2.79	-2.56	1.02	-0.16
Rio Grande	Colorado	5.85	-4.62	1.50	40°04
Rio Grande (N)	New Mexico	3.74	-2.98	1.22	+0,01
Rio Grande (S)	New Mexico	1.59	-1.98	0.48	+0°0
Pecos	New Mexico	2,75	-2.56	0.57	-0.40

*Average of Selected High Elevation Stations.

TOWNSHIP BUTTON BOT TO THE FORM OF THE CORE

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-5-RIO GRANDE DRAINAGE SNOW SURVEYS

Cover Measurements	lecord		(Inches)																							p				~	01				
r Meas	Past Record	3	tent		27.0	2.3	7.0	7.0	3.8	23.1	18.2	1.2	<u>.</u>	0.7													ω		27.0	2.3					
- 1		Yrs. of Av.	Rec.		77	77	14	77	15	H	15	12	H	#	7	7	~	7	2	7	2	~	ı	1	1	1			15	7	12	2	2	2	2
Snow	Inches		1949		39.5	6.8	0.8	0.3	2.0	30.0	18.7	0.0	8,2	0.0	18.5	0.3	20°5	9,1	10.8	べい	0.9	1,1	1	1	1	-	10.5		39.5	6.8	0.0	9.1	10.8	ν, ν,	0.9
	Water Content(I		1950		16.8	0.0	0.0	0.0	0.0	21.8	0.9	0.0	0.0	0.0	N°O	0.0	2.0	0.3	0.0	0.0	0.0	0.0	1	1	1		4.5		16.8	0.0	0.0	6.0	0.0	0.0	0.0
	Water		1951		20.9	0.0	0.0	0.0	j.0	16.2	10.5	0.0	4.5	0°0	8.6	0.0	7.7	1.9	3.9	1.4	0°0	3.1	4.9	28.8	3.8	22.1	5,3		20.9	0.0	0.0	7.9	3.9	1.4	0.0
	Snow		(Inches)		0.69	0.0	0.0	0.0	3.8	56.0	30.5	0°0	17.1	0°0	28.7	0.0	29.3	6.2	12.3	6.7	0.0	10.5	11.9	71.4	1.6	73.9	17.6		0.69	೦°೦	0.0	6.2	12.3	6.7	0.0
1 17.71	Date	of	Survey		1/30	5/1	17.27	5/1	1/30	1/30	5/2	5/1	1/30	1/29	1/30	5/1	5/2	4/28	17/27	1/30	1/30	11/30	1/29	1,/28	17/30	1/30			17/30	5/1	5/1	1/28	4/27	17/30	1/30
- A		Elev.			10000	9350	0096	9300	9300	11500	10000	9700	10000	8200	9950	9450	10100	10300	10900	10000	9300	10000	9800	11000	10400	11000	drainage		10000	9350	9700	10300	10900	10000	9300
		Range			田	马	贸	9	MOZ	旦	五五	2	105.2	724	P.	田田	띥	忌	31	ZE	当	黑	田	 E	M	医	for dra		2 至 2	巨	2	公	M	2 至 2	L.
Location		TwD			37N	NOT	36N	33N	285	37N	32N	NT7	7. 2N	29N	36N	35N	32N	NI	42N		Not	L53N	NT	12N	LIN	37N	Average 1		37N	MOT TO	NU	NZT	12N	NTT	NO
Loc		Sec			7	<u>പ</u>	15	2,	22	8	17	Φ	<u>m</u>	13	22	25	2ф	56	0	19	32	12	15	<u>n</u>	~	9	Ave		→	<u> </u>	∞	56	~	19	32
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	Drainage Basin	and	4	RIO GRANDE IN COI	Wolf Creek Pass	Upper Rio Grande	Silver Lakes	River Springs	La Veta Pass #2		Cumbres Pass #2	Santa Maria	Culebra	Ft. Garland	Platoro	West Conejos	La Manga	Pyramid	Spr. Creek Pass	Pool Table lit.	Lake Humphreys	Cochetopa Pass	Howardville	Red Mt. Pass	Porcupine	Wolf Creek Summit		UPPER RIO GRANDE	Wolf Creek Pass	Hpper Rio Grande	Santa Maria	Pyramid	Sp. Creek Pass	Pool Table Mt.	Lake Humohrevs

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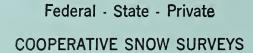
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REO GRANDE DRAINAGE SNOW SURVEYS May 1, 1951

		Location	tion		-			S	Snow Cover Measurements	r Measu	rements	3
Drainage Basin	No.					Date	Bnow	Water Content		(Inches)	Pé	Past Record
and	and	Sec.	Twp.	Range Elev		of					Yrs.of	Yrs. of Av. Water Con-
Snow Course	State				3,1	Survey	(Inches)	1951	1950	1949 Rec.	Rec.	tent (Inches)
ALAMOSA RIVER Silver Lakes Summitville	47 Colos 76 "	H M	5 36N 0 37N Average fo	医 E r dra	9600 1/27 11600 1/30 inage	e corpologorouges errolleding	0.0 56.0 28.0	0.0	0.0 21.8 10.9	0.8 30.0 15.1	14 11	1.0 23.1 12.0
CONEJOS RIVER River Springs Cumbres Pass #2 Platoro West Conejos La Manga CULEBRA RIV R	19 Colo. 77 "- 108 " 109 " 110 "	01H0010	5 33N 32N 36N 35N 35N 35N 32N 32N 32N 32N 32N 32N 32N 32N 32N 37.2N 1	SE LIW LE SE CAN CARAI	5E 9300 5/1 5E 10000 5/2 LW 9950 L/30 LE 9450 5/1 5E 10100 5/2 r drainage	5/2 7/2 2/2 2/2 2/2 2/2 2/2 2/2 2/2 2/2 2	0.0 30.5 28.7 0.0 17.7	10.50	0000000	0,3 18.7 18.5 20,3 11.6	11 2 2 11	118.20 11.00 1.00 1.00 1.00 1.00

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Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"